

## HEAT RADIATOR

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

The present invention relates to a heat radiator, and more particularly to a cooling means for lowering a temperature of a device or element which generates significant amounts of heat in operation.

#### 2. Description of Related Art

For lowering a temperature of a device or element such as a CPU, or electronic chips which generate lots of heat in operation, a heat radiator is generally mounted on the device or element.

A conventional heat radiator includes multiple fins formed on a body, and a fan installed on the fins. However, the fan in operation also will generate heat and gradually become hot, so the radiating effect of the conventional heat radiator is low.

A novel heat radiator assembled with a semiconductor refrigerating component utilizing the Peltire Effect is invented. The semiconductor refrigerating component includes a hot surface and a cold surface opposite to the hot surface with a temperature difference between the two surfaces. In operation, the cold surface will have a very low temperature to provide an improved radiating effect. However, the temperature of the hot surface will rise, so the cold surface cannot retain the predetermined low temperature and the heat radiator still does not have a satisfying radiating effect.

Therefore, the invention provides an improved heat radiator to mitigate or obviate the aforementioned problems.

1    **SUMMARY OF THE INVENTION**

2           The main objective of the present invention is to provide a heat radiator  
3    which has an improved radiating effect.

4           Other objectives, advantages and novel features of the invention will  
5    become more apparent from the following detailed description when taken in  
6    conjunction with the accompanying drawings.

7    **BRIEF DESCRIPTION OF THE DRAWINGS**

8           Fig. 1 is an exploded perspective view of a heat radiator in accordance  
9    with the invention;

10          Fig. 2 is a cross sectional view of the heat radiator without cooling liquid;  
11    and

12          Fig. 3 is a cross sectional view of the heat radiator with cooling liquid  
13    contained in a tank.

14   **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

15          With reference to Figs. 1-2, a heat radiator in accordance with the  
16    invention is composed of a water tank (10), a first radiating member (20), a  
17    second radiating member (30), a fan (40), and a cover (50).

18          The water tank (10) has a hollow body (not numbered) for containing a  
19    cooling liquid such as water (11), as shown in Fig. 3. Multiple barbs (12) are  
20    formed at upper edges of the water tank (10). A rim (not numbered) is formed in  
21    the water tank (10) and beneath the upper edges.

22          The first radiating member (20) is made of aluminum or other metals  
23    with a high heat conductivity. A top plate (21) is formed at a top of the first  
24    radiating member (20) and supported by the rim of the water tank (10) so as to

1 position the first radiating member (20) in the water tank (10). The top plate (21)  
2 and the rim can be sealed together to prevent the water (11) from leaking out  
3 from the water tank (10). Multiple first fins (22) are formed beneath the top plate  
4 (21) and immersed in the water (11). A heat insulating pad (24) is spread over the  
5 plate (21). At least one semiconductor refrigerating component (23) is mounted  
6 on the plate (21) and in the heat insulating pad (24). The refrigerating component  
7 (23) has a hot surface (not numbered) abutting the plate (21) and a cold surface  
8 (not numbered) exposed from the heat insulating pad (24).

9 A shield (25) is formed beneath the plate (21) and outside the first fins  
10 (22) with a length larger than the first fins (22). Thus, in an individually disposed  
11 status, the first member (20) can be supported by the shield (25), and the first fins  
12 (22) with a low strength are protected by the shield (25).

13 The second radiating member (30) is positioned on the first radiating  
14 member (20) and also made of aluminum or other metals with a high heat  
15 conductivity. A bottom plate (31) is formed at a bottom of the second radiating  
16 member (30) with an area over the semiconductor refrigerating component (23)  
17 and abuts the cold surface of the semiconductor refrigerating component (23).  
18 Multiple second fins (32) are formed on the bottom plate (31).

19 The fan (40) is secured on the second fins (32) of the second radiating  
20 member (30) by screws (not numbered). As usual, the fan (40) is composed of a  
21 frame (41), a stator (not numbered) and a rotor (42).

22 The cover (50) is detachably mounted on the water tank (10), and has  
23 multiple louvers (51) defined at top and side surfaces thereof. A handle (52) is  
24 formed on the cover (50) to facilitate a user to carry the heat radiator. Multiple

1 hooks (53) are formed at lower edges of the cover (50), and the barbs (12) are  
2 respectively attached to the hooks (53) to fasten the cover (50) on the water tank  
3 (10).

4         With reference to Fig. 3, in use, the electrified semiconductor  
5 refrigerating components (23) will become cold at the cold surface, and the  
6 temperature of the second radiating member (30) is accordingly lowered. Air  
7 drawn in by the fan (40) through the louver (51) at the top surface of the cover  
8 (50) flows through the second radiating member (30) and become cold, and then  
9 the cold air is blown out from the louvers (51) at the side surface of the cover (50)  
10 for cooling a hot object. The heat generated at the hot surface of the  
11 semiconductor refrigerating component (23) is insulated by the heat insulating  
12 pad (24) and only transferred to the first fins (22) of the first radiating member  
13 (20). Cooled by the water (11) in the water tank (10), the hot surface (232) can  
14 retain a low temperature, so the cold surface (231) has an improved radiating  
15 effect. Furthermore, the water tank (10) can be provided with a temperature  
16 controller (not shown) for stopping the operation of the semiconductor  
17 refrigerating component (23) in a situation of the temperature of the water (11)  
18 reaching a predetermined value.

19         Therefore, because the hot surface is cooled by water and the cold  
20 surface can retain a low temperature, the heat radiator according to the present  
21 invention has a good radiating effect.

22         It is to be understood, however, that even though numerous  
23 characteristics and advantages of the present invention have been set forth in the  
24 foregoing description, together with details of the structure and function of the

- 1 invention, the disclosure is illustrative only, and changes may be made in detail,
- 2 especially in matters of shape, size, and arrangement of parts within the
- 3 principles of the invention to the full extent indicated by the broad general
- 4 meaning of the terms in which the appended claims are expressed.